Government’s science minister backs Aston University-led neuromorphic computing research

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The UK Multidisciplinary Centre for Neuromorphic Computing is headed by the Aston Institute of Photonic Technologies (AIPT)

The consortium of seven universities and 22 non-academic partners was officially launched at the House of Lords

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A new research centre led by Aston University could be key to tackling the huge consumption of energy by data centres in the UK.

The UK Multidisciplinary Centre for Neuromorphic Computing is headed by the Aston Institute of Photonic Technologies (AIPT) and was officially launched at the House of Lords on 21 October.

Neuromorphic computing seeks to replicate how the brain functions and its structure and apply that knowledge to develop future computing systems. Currently scientists lack a deep, system-level understanding of how the human organ computes at cellular and network scales.

The researchers within the consortium of seven universities, alongside 22 non-academic partners, will aim to tackle that challenge directly, blending stem-cell-derived human neuron experiments with advanced computational models, development of new materials, low-power algorithms and novel photonic - or light-based - hardware.

As well as speakers from politics and science, a message from the Minister for Science, Innovation, Research and Nuclear, Lord Patrick Vallance was delivered to the guests at the Houses of Parliament reception. Speaking via video he said that he believed the initiative could be key to tackling the issue of massive energy use by data centres. Current government figures show that they use about 2.5% of the UK's electricity, a figure projected to rise significantly with the further advances in AI.

Lord Vallance said: “Data centres demand enormous energy and water resources and left unchecked. Without thinking about how we can manage this and innovate we would threaten clean energy and net zero ambitions.

He added: “Future computing paradigms offer a potential path to not only more ways of thinking about how to compute but also overcoming some of the traditional limitations of traditional computing, particularly in scenarios where energy efficiency or new capabilities are important. It seems to me the centre embodies that ambition; neuromorphic computing, inspired by the brain's really remarkable energy efficiency, could fundamentally transform how AI operates.”

The centre received £5.6 million funding over four years from the Engineering and Physical Sciences Research Council. However, its director, Professor Sergei Turitsyn of AIPT told launch guests that it is his ambition for the centre to be financially sustainable beyond its initial EPSRC funding period. He also stated that he believes that the centre will be instrumental in putting the UK at the forefront of the neuromorphic computing research.

He said: “The ultimate goal is to build a new UK brand in neuromorphic computing, working closely with the recently funded UK network project NeuMat and the Innovation and Knowledge Centre Neuroware.

“Some people ask ‘what exactly is neuromorphic computing? Arguably, there no universal answer, and this is exactly the point about our centre. Some people tell you it is nature-or brain-inspired, others stress non digital features and some focus on energy saving or analogue signal processing. That's why we need researchers from different disciplines to work together and that is why this group of universities and industrial partners will start this broad approach, with neuroscientists, working with experts in material science, algorithms, electronics and photonics.”

The centre will be led by the AIPT and will include world-leading researchers from Aston University, the University of Oxford, the University of Cambridge, the University of Southampton, Queen Mary University

of London, Loughborough University and the University of Strathclyde. The centre will be supported by a broad network of industry partners to enhance the centre's impact on society. These include Microsoft Research, Thales, BT, QinetiQ, Nokia Bell Labs, Hewlett Packard Labs, Leonardo, Northrop Grumman and a number of small to medium enterprises.

Water use in data centres: https://assets.publishing.service.gov.uk/media/688cb407dc6688ed50878367/Water_use_in_data_centre_and_AI_report.pdf

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For over 130 years, Aston University has been making our world a better place through education, research and innovation. Our history is intertwined with the remarkable city of Birmingham, once the heartland of the Industrial Revolution and now the thriving base for an innovation ecosystem of global significance, which Aston is co-creating.

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